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ALEXANDRIA, VA 22314				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/802,913	SUZUKI ET AL.
Examiner	Art Unit	
Adi Amrany	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 14 June 2007.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-8 and 11-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) 15-17 is/are allowed.

6) Claim(s) 1-8, 11 and 18-20 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) Paper No(s)/Mail Date. ____.
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/9/07. 5) Notice of Informal Patent Application
6) Other: ____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed June 14, 2007, have been fully considered but they are not persuasive. Penny discloses that both FC and SATA disks can be used in the same system, where the SATA disks comprise a FC communication interface (par 25, lines 25-28). Although Penny does not expressly use the term, "converter," it is inherent that the Penny system includes a converter between the ATA disk and the FC interface. There is no other way to change ("convert") from a SATA to a FC protocol without a converter.

In the final rejection (March 26, 2007), Examiner listed several references that disclose a FC/SATA converter (conclusion, page 12), and also stated that several of applicants' IDS references disclose a FC/SATA converter. Applicants have not responded to or argued against the interpretation that these references disclose a FC/SATA converter. Two of these references are expanded upon in the §103 rejections below.

Applicants' argument that Penny does not disclose a voltage converter and that Mizuno does not disclose a FC/SATA converter is not persuasive since applicants are arguing against the references individually. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Information Disclosure Statement

2. The information disclosure statement filed February 9, 2007 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. The copy of the non-patent literature reference, EMC 2-Gigabit Disk-Array Enclosure (IDS of 2/9/07, page 18), only contains odd-numbered pages.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 has been amended to indicate that the first voltage converter receives power from one of the first power supplies. Claim 6 then recites that the first voltage converter receives a plurality of input values. This rejection was made in the final rejection, but was not addressed in applicants' response.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-8, 11-14 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oomori (US 2004/0003306) in view of Mizuno (US 5,838,891), Penny (US 2004/0199515) and Adaptec FS4500 Fibre to SATA RAID (from applicants' IDS, 2/9/07, item AS).

With respect to claim 1, Oomori discloses a storage system (fig 1, item 11; par 18), which can be connected to a host computer, having:

a plurality of storage devices (fig 1, item 114; par 19) which store data from said host;

a plurality of housings in which said plurality of storage devices are mounted (fig 1, item 114);

a plurality of first power supplies (fig 1, item 21; par 22) which supply a voltage to said plurality of storage devices; and

a casing (item 11);

Oomori does not expressly disclose:

- A. at least one of said plurality of housings has a first voltage converter.
- B. said storage devices are Fibre Channel (FC) or Serial Advanced Technology Attachment (SATA) storage devices,
- C. said housing having a SATA converter also includes a FC/SATA converter
- D. the first voltage converter supplies power to the SATA storage device and the FC/SATA converter.

A. Mizuno discloses a storage system connected to a host computer comprising a casing that includes a plurality of storage devices and a plurality of housings (figs 3, 6, item 6; col. 5, lines 56-59). Mizuno further discloses at least one of said plurality of housings has a first voltage converter (col. 8, lines 20-24).

Mizuno discloses that the converter generates two voltages (5 and 12v), which are necessary to power the internal circuits of the housing. It would have been obvious to one skilled in the art to reconfigure the Mizuno converter to output only one voltage in a storage system housing that only requires one voltage level.

Oomori and Mizuno are analogous because they are from the same field of endeavor, namely power supplies for computer storage systems. At the time of the invention by applicants, it would have been obvious to one skilled in the art to modify the Oomori storage system by configuring the DC/DC converter within the housing of the storage devices in order to allow the DC/DC converter to be specifically tailored to the corresponding storage device.

B. Penny discloses said plurality of storage devices are FC or SATA storage devices (fig 7, items 710-718; par 33-34). It is inherent that Penny includes a converter in order to couple the SATA disk to the FC communication interface (par 33, lines 12-14).

Oomori, Mizuno and Penny are analogous because they are from the same field of endeavor, namely RAID systems. At the time of the invention by applicants, it would have been obvious to one skilled in the art to combine the Oomori and Mizuno power

systems with the Penny FC/SATA storage systems in order to support a plurality of storage device types (Penny, abstract).

C. Adaptec discloses a storage system, which can be connected to a host computer, having a plurality of storage devices, wherein said housing having a SATA storage device also includes a FC/SATA converter (par 2).

Oomori, Mizuno, Penny and Adaptec are analogous because they are from the same field of endeavor, namely RAID systems. At the time of the invention by applicants, it would have been obvious to one skilled in the art to combine the Oomori, Mizuno and Penny storage systems with the Adaptec FC/SATA converter in order to allow the Penny SATA devices to properly communicate with the FC host computer (Adaptec, par 1).

D. Mizuno discloses that the first voltage converter supplies power to the internal circuits of the storage device housing. It would be obvious to one skilled in the art to supply power from the Mizuno converter to the Penny SATA storage device and the Adaptec FC/SATA converter, because the Mizuno converter is designed to supply power to all of the storage device's internal components (col. 8, lines 20-24).

With respect to claim 2, it would be obvious to configure the Mizuno first voltage converter to supply power via a single power supply line. The number of supply lines is determined by the configuration of internal circuits.

With respect to claim 3, Oomori discloses said plurality of first power supplies are AC/DC power supplies (fig 1, items 211-213; par 22). Mizuno discloses said first

voltage converter is a DC/DC converter. It would be obvious to configure said first voltage value to be higher than said single voltage value (Mizuno converter is a buck converter), since the output of the converter is determined by the configuration of the storage device circuitry.

With respect to claim 4, Mizuno discloses said plurality of storage devices incorporate internal voltage conversion circuits, as discussed above.

With respect to claim 5, Mizuno discloses power having one of the plurality of voltage values converted by said internal voltage conversion circuits is used to drive magnetic storage media of said storage devices, and power having another of said plurality of voltage values is used to drive interface logic circuit of said storage devices (col. 8, lines 20-24).

With respect to claim 6, Mizuno discloses said first voltage converter receives power one voltage value, as discussed above.

With respect to claim 7, Mizuno discloses:

wherein any of said plurality of housings is a first housing (fig 6; topmost disk enclosure) having a first voltage converter; and

wherein any of the other of said plurality of housings is a second housing (figure 6; nth disk enclosure) having a second voltage converter.

It would be obvious to one skilled in the art to configure the plurality of Mizuno DC/DC converters to output a different voltage level, as determined by the associated storage device because the Mizuno converter is designed to supply power to all of the storage device's internal components.

With respect to claim 8, Oomori further discloses a motherboard is positioned between said first power supplies and said housings, and said first voltage converter is connected, via said motherboard, to a power supply line connecting said storage device. Mizuno also disclose a motherboard (fig 6, item 9).

With respect to claim 11, Oomori discloses a storage system (fig 1, item 11; par 18), comprising:

 a power supply circuit (figs 1, 4, item 21; par 22) which outputs a single type of power having a single voltage value (fig 4, item 42; par 26, lines 1-5);
 a main body (figs 1, 4, item 11; parh 18) having a main power supply line to transmit said single type of power output from said power supply circuit (inherent), a data transfer path for data transfer (fig 1, "motherboard", paragraph 20), and a plurality of pack connection sites (fig 1, connection between motherboard and item 114);

 a plurality of storage device packs (fig1, items 114; par 19) which can receive said single type of power from said main power supply line (par 26, lines 5-8), which are each connected to said plurality of pack connection sites (connection motherboard and items 114) on said main body so as to enable exchange of data with said data transfer path, and which can be removed from said pack connection sites;

 wherein each storage device pack comprises a physical storage device (fig 1, items 114) requiring the supply of one or more types of power each having a prescribed voltage level;

wherein the voltage level of said single type of power form said main power supply line is equal to or higher than the highest voltage level of said one or more types of power required by said physical storage device (page 2, par 26); and

a casing (item 11)

Oomori does not expressly disclose:

- A. at least one of said plurality of housings has a first voltage converter.
- B. said storage devices are Fibre Channel (FC) or Serial Advanced Technology Attachment (SATA) storage devices,
- C. said housing having a SATA converter also includes a FC/SATA converter
- D. the first voltage converter supplies power to the SATA storage device and the FC/SATA converter.

A. Mizuno discloses a storage system connected to a host computer comprising a casing that includes a plurality of storage devices and a plurality of housings (figs 3, 6, item 6; col. 5, lines 56-59). Mizuno further discloses at least one of said plurality of housings has a first voltage converter (col. 8, lines 20-24). It would have been obvious to one skilled in the art to reconfigure the Mizuno converter to output only one voltage in a storage system housing that only requires one voltage level, as discussed above.

B. Penny discloses said plurality of storage devices are FC or SATA storage devices (fig 7, items 710-718; pars 33-34).

C. Adaptec discloses a storage system, which can be connected to a host computer, having a plurality of storage devices, wherein said housing having a SATA storage device also includes a FC/SATA converter (par 2).

D. Mizuno discloses that the first voltage converter supplies power to the internal circuits of the storage device housing (col. 8, lines 20-24).

Oomori, Mizuno, Penny and Adaptec are analogous, as discussed above.

With respect to claim 12, Mizuno further discloses:

 said first type of storage device pack (figs 3,6, item 6) comprises a multiple-power-supply type physical storage device which requires the supply of a plurality of types of power each having a prescribed voltage level (col. 8, lines 20-24); and

 a power conversion circuit (item 6, "converter") which converts said single type of power from said main power line into the plurality of types of power required by said multiple-power-supply type physical storage device, and inputs said plurality of types of power to said multiple-power-supply type physical storage device; and

 said second type of storage device pack (item 6) comprises a single-power-supply type physical storage device which requires the supply of one type of power having a prescribed voltage level; and

 a power conversion circuit (item 6, "converter") which converts said single type of power from said main power line into the plurality of types of power

required by said multiple-power-supply type physical storage device, and inputs said plurality of types of power to said multiple-power-supply type physical storage device; and each type of storage device pack can be connected to any of said plurality of pack connection sites (fig 6, item 9; col. 8, lines 14-19) on said main body.

Mizuno discloses that each storage device pack contains its own unique and specially configured DC/DC converter. It would be obvious to one skilled in the art that a single-power level storage device would only require the associated DC/DC converter to output one voltage level.

With respect to claim 13, it would be obvious to one skilled in the art that a storage device pack that comprises a physical storage device and a DC/DC converter may comprises any number of internal power supply lines connecting the converter and storage device without affecting the compatibility of the storage device with the external pack connection sites.

With respect to claim 14, Mizuno discloses:

 said first type of storage device pack comprises a first type of physical storage device (figs 3, 6, item 6, topmost disk) requiring the supply of a first type of power having a first voltage level (col. 8, lines 20-24); and a power conversion circuit (item 6, "converter"); and

 said second type of storage device pack comprises a second type of physical storage device (item 6, nth disk) requiring the supply of a second type of

power having a second voltage level different from said first voltage level; and a power conversion circuit;

wherein each type of storage device pack can be connected to any of said plurality of pack connection sites (fig 6, item 9; col. 8, lines 14-19).

As discussed above, it would be obvious to one skilled in the art to configure each DC/DC converter to supply the correct power, as required by its associated storage device.

With respect to claim 18, Oomori discloses a control circuit (fig 1, item 112; par 19), and further discloses that each power conversion circuit comprises regulators (par 39). It would be obvious to one skilled in the art that the Oomori system comprises a power supply control circuit which individually controls the turning-on and turning-off of said power conversion circuits. At the time of the invention by applicants, it would have been obvious to combine the control circuit disclosed in Oomori with the internal conversion circuits disclosed in Mizuno. The motivation for doing so would have been to supply the correct amount of power (full vs zero) to the storage devices.

With respect to claim 19, and as discussed above, Oomori discloses a control circuit and that each power conversion circuit comprises regulators. It would be obvious to one skilled in the art that the Oomori system comprises a power supply control circuit which individually controls the output voltage levels of said power conversion circuits according to the power supply voltage levels required by each of said physical storage devices within said plurality of storage device packs. At the time of the invention by applicants, it would have been obvious to combine the control circuit disclosed in

Oomori with the internal conversion circuits disclosed in Mizuno, in order to supply the correct amount of power to the storage devices.

With respect to claim 20, Oomori further discloses said physical storage device is a hard disk drive (fig 1, item 114; par 19).

7. Claims 1-8, 11-14 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oomori in view of Mizuno, Penny and Fujie (US 2003/0110330).

Oomori, Mizuno and Penny disclose the limitations of claims 1-8, 11-4 and 18-20, as discussed above, but do not expressly disclose a FC/SATA converter. Fujie discloses a storage system having a plurality of storage devices (fig 2), wherein said SATA storage devices include a FC/SATA converter (item 24; par 39-43).

Oomori, Mizuno, Penny and Fujie are analogous because they are from the same field of endeavor, namely RAID systems. At the time of the invention by applicants, it would have been obvious to one skilled in the art to combine the Oomori, Mizuno and Penny storage systems with the Fujie FC/SATA converter in order to allow the Penny SATA devices to properly communicate with the FC host computer (Fujie, abstract).

Allowable Subject Matter

8. Claims 15-17 are allowed, as indicated in the previous Office Action (November 30, 2006).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicants are requested to review the cited references in their

entirety, including IDS references directed to SATA storage devices connected to a FC host.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adi Amrany whose telephone number is (571) 272-0415. The examiner can normally be reached on Mon-Thurs, from 10am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA



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